The MAC Flyer

FEBRUARY 1976

One Caged, Three Questionables. Page 3.

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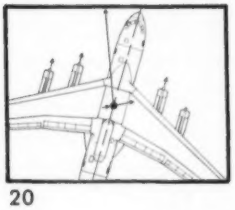
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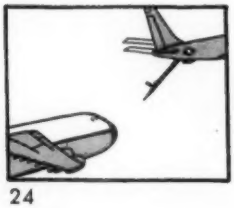
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Hours of Terror

"We had number four caged and shutdown conditions existed on the other three . . . As far as I knew there had never been a successful ditching of an Air Force C-130"

by Maj John O'Connor
DCASO
Hayes International Corp.
Birmingham, Ala.

There's probably neither a real moral to this story, nor any cut-and-dried lessons to be learned. I'll let you be the judge of that. But I feel compelled to tell someone about that trip over the Pacific last February. I have flown for thousands of hours, a great many of them with MAC, and have never experienced anything to equal it in terms of sustained anticipation. Or, if you prefer, continuous fright.

First off, I'm assigned to the test flight section of the Defense Contract Administration Office (DCASO) at Hayes International Corporation here in Birmingham, Alabama. We fly acceptance check flights on aircraft undergoing periodic depot maintenace. I'm a navigator, which doesn't have much to do with the story, but let me begin.

It had been a long time since any of us had gone on a decent TDY trip. But this time we drew a good one — we were to fly a C-130 gunship from Alaska to Korat, Thailand. Looking back, I remember that some of us had an uneasy feeling about the ferry flight, but in view of all that happened, maybe this is Monday morning quarterbacking.

I won't go into detail about our preparation for flight — you all know that bit. I'll just begin at the point where everything started going to hell in a basket.

We launched the Herky into a beautiful Alaskan sky, the kind you see in the travel posters. How well I remember. I can recall seeing smoke billowing from a huge fire in downtown Anchorage as we climbed out. We were feeling pretty good. Adak was our first stop and the forecast was for hot and dusty. But about midway into the flight, things started happening.

Our earlier premonitions began to hit home when Sergeant Hall — we call him Bud — reported fluid flowing from between the outer dry bay and number four engine. Well, that sounded bad to me, although I don't know as much about aircraft systems as I would like. But when our aircraft commander, Dave Harmon, decided to shut down number four, I knew I was right. Dave figured we probably had fuel in the dry bay. Well, while we were debating whether to continue or return to Anchorage, we crossed paths with another Hercules gunship that was en route to Elmendorf from Adak. The pilot confirmed the good weather at Adak, so we pressed on.

We were feeling pretty good about our situation by the time we got within UHF range of Adak. But how quickly things change. Adak Approach reported ice already on the runway and snow was forecast for our arrival time. A fast-moving cold front would beat us there! Closer in, Mother Nature really lowered the boom on us. The ceiling had dropped to 100 feet and visibility was a half mile, with intermittent conditions of 300 and one and a half. We'd have to land our crippled bird into an 18-knot right

"There it is again — better shut it down — now!"

crosswind, blowing snow and on an RCR of 4. We would have chosen somewhere else to land, but by this time, our fuel supply committed us to Adak.

Dave was having a go at a precision approach and we were on final when the controller called the field below minimums. We were all mentally setting up for a missed approach when, at about two miles, the weather came back up to minimums. The engine-out hadn't created much of a problem on final, but after touchdown, Dave, and Capt Harry Hillman, the copilot, had to manhandle the yoke to overcome the crosswind. We rolled to a stop with a collective sigh of relief. Now, the reason for our earlier premonition was behind us, or so we thought, and we were intent on enjoying the remainder of the trip.

Hell Breaks Loose

The next leg, to Midway, was as serene as any I can remember. We counted gooney birds during our crew rest and the following morning set out for Kwajalein on what was to be the most harrowing peacetime flight of my career.

We didn't even get on the runway before things began to happen. We were taxiing to the runup area when a cargo compartment overheat light illuminated and the pressurization failed. As we taxied back toward the ramp for maintenance, we saw some sergeant running toward us. He was frantically motioning toward number two engine. What caused his excitement was a 15-foot streak of flame shooting out of the engine. Dave quickly feathered it. We shut down and found that a hydraulic hose inside the nacelle had broken and the fluid was burning.

The hydraulic line was repaired, but we had to go without pressurization. We got off once again and the peaceful Pacific was passing slowly beneath us when, just two hours from Kwaj, Sergeant Hall came on interphone.

"Hey, AC, this is the engineer. I think I saw a few little puffs of fire coming from number four engine."

He might as well have said, "All hell is about to break loose" because that was exactly what was about to happen. For a few minutes number four's instruments indicated normal, so we kept 'er running. Then, Sergeant Hall saw it again.

"There it is again — more — better shut it down — now!"

Dave took the suggestion and in seconds we had shut it down. But we still had three good ones left. For that we were all thankful.

But our state of bliss didn't last long. Dave had no sooner returned his hand to the yoke from the number four T-handle when number one oil low light flashed like an ominous beacon. As if that weren't enough, Sergeant Martin, the loadmaster, reported a loss of hydraulic fluid in the utility system. Since the utility system goes to number two and four engines — and since four was feathered — this meant that we most likely had a problem in number two.

Sharks Below

By now, it had occurred to me that we were flying over some of the most shark-infested water in the world. But before I could even think, "Jaws," the voice of our flight engineer gave me something else to think about.

"Hey, I don't know how to tell you guys this." He paused for several seconds as we all braced ourselves for the next event, "but there's fluid flowing back about ten inches inboard of the number three tail pipe. Can't tell for sure what it is."

It had to be fuel, but no one said so.

In a simulator, such a combination of emergencies would have seemed unrealistic. We had number four shut down already and shutdown conditions now existed on the other three. At about this point, it occurred to me that as far as I knew there had never been a successful ditching of an Air Force C-130.

"We'll shut down the first one that catches fire," announced our aircraft commander. "Until then, we just have to let 'em run." My sentiments exactly.

We started back toward Kwaj — an hour and 17 minutes away. I plotted the time and bearing to several atolls, but the coconut and kava trees lining the small beaches just about ruled them out as landing sites. Meanwhile, the oil low light on number one glared at us like a cyclops. Number two hydraulic pump was shut down to save what fluid we could, and what apparently was fuel continued to flow from around number three. Number four prop was as stiff and straight as a good soldier.

Naturally no one heard our HF calls for help in this part of the world. That didn't help our morale much, because most of us felt that within a matter of minutes we would need rescue in the worst possible way. Every one kept bugging me for the time left to Kwaj. After staring at the radar set for what seemed like decades, I finally noticed a return at 12 o'clock. I have never seen a blip anywhere that caused

my spirits to soar as this one did. It was Kwaj. We had it on radar. Now, if we could hold out just a little longer.

Almost There

A 6,700-foot runway awaited us if we could make it. We decided to land without reverse because of the fluid flowing from number three. We were down to the before-landing checklist when we decided the odds were shifting to our favor. Dave flew it onto the runway and as the wheels touched down I felt like shouting. Instead, there was a shout from the loadmaster.

"By now, it occurred to me that we were flying over some of the most shark infested water in the world."

"Number three is smoking," he yelled. Hell, I couldn't have cared less if it had been shooting speed. We were on the ground! But Dave caged it and, since number one had shown signs of coming unglued, he feathered it, too. The fire department met us and we taxied off the runway on one engine. We shut down and there was a long silence as our emotionally drained crew silently reflected — and, I think, gave thanks — that we had arrived.

We invaded the local club that evening and, to put it mildly, the alcoholic abuse folks would not have been proud of us. But it had been an unusual day, so perhaps we can be forgiven. The next day we went back down to talk to the maintenance guys. What they told us almost sent us scurrying back to the club.

What Had Happened

In chronological order, this is what happened to our machine. Our problems had started when the turbine section in number four started wobbling. The engine was on the verge of disintegration when we shut it down. Our instruments never indicated this. But had it disintegrated, chances are that red hot shrapnel would have ripped through our wing and fuselage. The oil quantity on number one was almost undetectable, and our old friend the hydraulic hose had come lose again on number two, pouring fluid into the hot nacelle. A pin hole in the hose had also sprayed atomized hydraulic mist into the engine. The fluid which had flowed so freely from number three was, indeed, fuel. The maintenance folks found that the center wing box was puddled with four inches of it and two and a half inches were standing in numbers three and four dry bays. Altogether, there was enough fuel in these areas for 17 more minutes of flying — if we could have found some way to get it back into the tanks.

Well, that's about all there is to the story — fortunately for us, I might add. I've flown a lot of aircraft, but this is the only time I could ever really feel fate catching up to me. Why we made it, I don't know. Like I said, maybe there's no moral here. Well-trained crew members who made the right decisions at the right time, perhaps. Luck, maybe, or even a combination of many factors. Incidentally, I have ferried several C-130's since this near miss, but never another AC-130A.

Frankly, I'm not too unhappy about that.

ABOUT THE AUTHOR

Major O'Connor is a senior navigator assigned to the test flight mission of DCASO (Defense Contract Administrative Services Office), Hayes International Corp., Birmingham, Ala. As an airman, he flew for six years, primarily with Air Weather Service. He was commissioned through OCS in 1960 and shortly afterward completed navigator/bombardier training. Major O'Connor flew MAC C-118's at Hickam AFB, C-124's at Hill AFB, and HC-130's at Lajes. He was later assigned to Scott AFB and his present assignment followed a SEA tour in C-130's.

Flight

Aircrews who have flown there realize that operating in the airspace of some African countries is no picnic. Now, a survey report of airfields in six African countries details many of the problems that flight crews can expect to encounter and makes recommendations on improving the operational environment.

The report of the survey, the second directed by Gen Paul K. Carlton, Commander, MAC, was published in November. The first survey was conducted in South America in 1974 (THE MAC FLYER, April 1975).

The survey team was headed by Col Robert A. Johnston, Jr., of the MAC Inspector General's Office, who was also team chief for the South American survey. The team's purpose was to identify hazards and deficiencies at facilities used by U. S. Air Force and civil operators. Emphasis was placed on the suitability and adequacy of instrument procedures, weather data acquisition and dissemination, air traffic control, and communications and airfield facilities. Countries visited were Senegal, Liberia, Zaire, South Africa, Kenya, and Ethiopia.

Instrument Procedures

The adequacy of airport instrument procedures varied, but there was agreement among team members that instrument approaches and depiction of published landing minima need standardizing for optimum effectiveness. For example, approach charts for one of the airports are produced by at least four charting agencies with a wide range of styling, format, and landing minima depiction. The listed landing minima differed, although by very little, on each chart. MAC aircrews are required to use published DOD plates, but may use Jeppesen approach plates at locations for which no DOD plates have been published. DOD plates were available for all the fields included in the survey, although some of the host countries had approaches not depicted in DOD plates.

Unlike the terrain in South America, African topography presents no serious problems insofar as en route terrain clearance requirements are concerned. Only at one of the fields visited, Addis Ababa, Ethiopia, did mountainous terrain create potential problems for departing aircraft. There are no DOD published departure procedures for any of the African airfields visited, although some host countries publish their own. These are not available to U. S. aircrews and may not conform with U. S. clearance criteria; however, some countries supplement their own Aeronautical Information Publications to satisfy U. S. civil and military requirements.

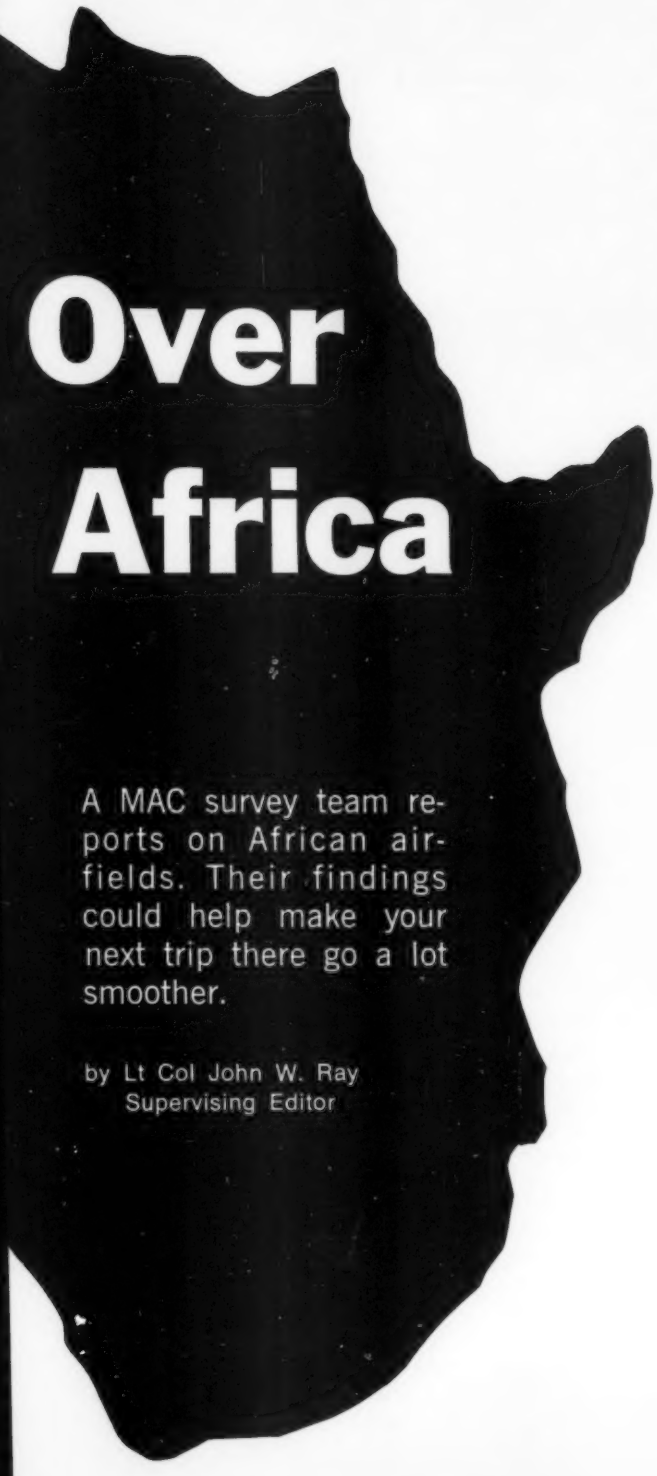
Air Traffic Control

Although the air traffic environment in most African airspace is of the nonradar variety, the traffic control provided at those airfields visited seems adequate for U. S. operations. But problems exist.

The quality of traffic control varies from excellent at some locations to marginal at others and is "unknown" at a few. One of the most frequent problems aircrews can expect to encounter is poor air-to-ground communications which hampers coordination of flight information between air traffic control agencies. Often, an aircraft will arrive at an FIR boundary or destination terminal control area before the ICAO flight plan reaches the local ATC agency.

Communications Problems

U. S. pilots often compound the communications problems by their failure to make compulsory posi-



Over Africa

A MAC survey team reports on African airfields. Their findings could help make your next trip there go a lot smoother.

by Lt Col John W. Ray
Supervising Editor

tion reports. And in a nonradar environment, the absence of position reports creates serious gaps for controllers attempting to provide traffic separation. Faulty radio reception in many areas adds to this problem. It was suggested that when contact cannot be made with ground stations, crews should attempt to relay flight plan information via other aircraft on VHF frequency 126.9.

Many aircrews inadvertently create confusion for ground controllers and themselves by speaking too fast to be understood and using nonstandard phraseology. Air traffic controllers who were contacted agreed almost unanimously on this point. Language problems do exist in some countries, the report emphasized, and words must be spoken slowly and distinctly. To avoid serious errors in clearances, crews should read back all ATC clearances, headings, and altitudes — using standard terminology rather than jargon that could be misinterpreted.

The crew of the C-141 which airlifted the survey team reported marginal communications support; several position reports had to be made in the blind or relayed through other aircraft. Radio communications were satisfactory while the aircraft was flying from north to south, but deteriorated severely during east-to-west flights. Single side-band communications below ten degrees north were also inadequate.

Air traffic controller training and qualification appear adequate at all of the facilities visited by the survey team. It was pointed out that the length of formal training received by controllers at each location exceeded that required by U. S. controllers.

Various aspects of the weather communications system employed throughout Africa were discussed in the report. Weather support is adequate at those fields visited — but in some cases, there are specific procedures for obtaining it. For example, at one airfield, support could be provided to virtually any place in the world, but only if the crew requested weather information — in writing — four hours in advance. Upon arrival at each airfield aircrews should become familiar with requirements to ensure adequate weather support. Much of this information can be found in the host country Aeronautical Information Publication (AIP).

Members of the team said that, overall, the flying environment in Africa is safe for the present U. S. operation. It can be made more so by aircrews themselves becoming more knowledgeable in what to expect while flying there.

Global Notes

infant save

An all-Reserve crew composed of Capt Oral W. Carper, Capt Louis J. Budge, and Sgt Charles E. Stephenson helped save the life of seven-day-old Wait Barney, Warm Springs Indian Reservation, Oregon. The **304 ARRS** crew lifted a four-man medical team of the University of Oregon, to Yakima Health Center to pick up the baby, who suffered from a congenital heart problem. He was placed in a portable isolette which had been installed in the helicopter, and the aircraft returned to the Portland ANG Base. The baby was then rushed to the University's special facility for newborns.

pinned by spoiler

Evan C. Zimmerman, James A. Scales, Jr., Jerry Barnett, and Roger M. Eagle, 375 CAMS, Scott AFB, Ill. While lubricating the spoiler mechanism on the wing of a C-9, an airman removed a safety lock to gain access to the lubrication points. Removal of the lock caused the spoiler door to close on the airman's neck. Mr. Zimmerman promptly applied hydraulic system pressure and raised the spoiler door that held the airman pinned. The other three individuals removed the airman, who was unconscious. They administered cardio-pulmonary resuscitation and the airman regained consciousness. The quick actions of these individuals prevented possible loss of life or serious injury.

a bird in the hand

"Operation Longwing" may not be getting off the ground in the CONUS, but it's flying high at many bases in England. The birds with the long wings are some of

our feathered friends — falcons used to hunt down and clear the sky of flocks of lapwings, seagulls, pigeons, and other birds that make the airways dangerous for aircraft.

At RAF Mildenhall, Falconer Phil Bland and his ten falcons work from dawn to dusk, seven days a week, scanning the skies over the 1,000 acres of land that make up the transport base. Mildenhall is located on one of the busiest migratory routes for birds in the country. Others are attracted to the airfield because they like nesting by the large open spaces. Falconer Bland, who works closely with air traffic controllers, on a busy day may fly each falcon on three or more flights, chasing birds away from the flight line.

Almost all U. S. military personnel and their families who come to England for assignment process through RAF Mildenhall's passenger terminal. MAC aircraft and charter flights move about 8,000 people a month in and out of the "Gateway to the United Kingdom." With this large number of people and expensive aircraft, the best possible protection is needed. And the U. S. Air Force provides it, pitting nature against nature for the safeguarding of lives and resources — and it works.

correction: make that 500,000

Our apologies to the 89th Military Airlift Wing, Andrews AFB, Md., for our typographical error in reporting the unit's total accident-free flying hours. The October "Global Notes" should have credited the 89th with a total of 500,000 hours of safe flying since activation in 1947 — an achievement which set a longevity record for MAC wings of over 25 years of safe flying.

A set of 20-20 eyeballs is not always enough to overcome visual deception in the air.

Hazy Daze

Pilots who have no trace of nearsightedness (myopia) at ground level may have experienced this condition at altitude without realizing what was happening. On a clear but hazy day, when mountains or other distant points are not outlined sharply against the horizon, the ability of the normal eye to maintain a distant focus is weakened. The focus tends to recede back toward the viewer after a short lapse of time, as the eye fails to find a distant point to fix on.

Under such circumstances, scanning for other aircraft becomes difficult and requires a special effort on the part of pilots. Otherwise, small targets may escape attention, and with the extremely rapid closing speed of high performance aircraft on converging or collision courses, the danger of an accident or near midair collision increases.

Several years ago a midair collision between an Air Force jet and a civilian aircraft prompted the Air Force to make a study of visual problems associated with hazy conditions. The investigators were interested in learning just how the human eye reacts to reduced light contrast, such as that produced by haze, smoke and fog.

On the day in question, the weather was VFR and the aircraft involved were not under Air Traffic Control. Four military fighters were climbing through 8,000 feet in an airspace designated by FAA as a high volume jet area. The Airman's Information Manual advises civilian pilots to avoid such areas. Nevertheless, the pilot of a light civilian trainer was transiting the area on a course convergent to that of the four Air Force fighters.

The military jets were in a shallow climb at 420 knots when the pilot of the number two fighter was requested to check a malfunction on the right external fuel tank of the lead plane. He visually scanned the area prior to moving closer to his leader and was viewing the tank when he heard the warning, "Light plane — 12 o'clock." The pilot looked up in time to see a "light colored blur" which passed between him and the number one aircraft. His vertical stabilizer sheared off several feet of the right wing of the civilian plane, which went out of control, disintegrated, and crashed. There was no serious damage to the military aircraft.

The puzzling and disturbing question was how four highly trained and proficient fighter pilots could have failed to see the civilian aircraft in time to prevent the collision. The impact occurred about 15 seconds after the number two pilot's last scan, but the other three military pilots were scanning continuously. Visibility was good — estimated at five to ten miles by the pilots.

The treacherous factor here was apparently haze, which created an indistinct background. Hazy sunlight desaturates color and contrast and makes it difficult to see clear outlines — especially if they happen to be painted white and turquoise, as the light plane was.

Under these conditions, investigators learned, the human eye has difficulty holding a focus at a distance greater than approximately one mile. The hazier the background, the greater the tendency of the focus to recede toward the viewer. Increasing altitude also plays a contributing role in this phenomenon.

Reducing the focal range of the pilot's vision resulted in a shortened span of time in which to perceive the danger and take evasive action. Since the closure rate between the military element and the light plane was estimated at just under a quarter of a mile per second, it is obvious that the time lost through "altitude myopia" was critical.

The study brings out clearly the importance of constant *scanning*, as opposed to *staring*. The acuity of the human eye is much greater at the fovea, the small point in the center of the retina which receives light impressions

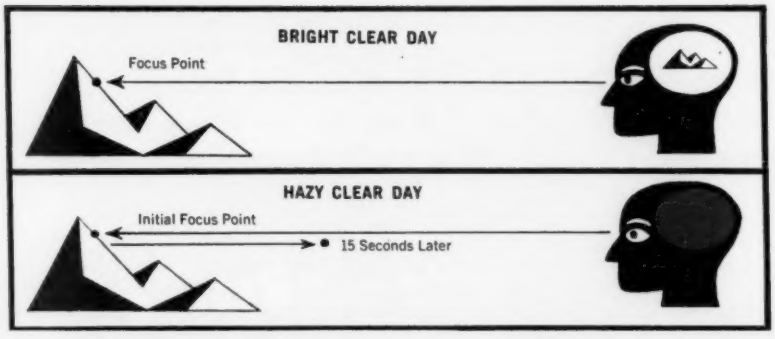
Hazy Daze

from objects that are in focus. The eye is less sensitive to objects which appear within the peripheral region. Scanning by means of eye movement allows the visual focus to move over the entire area of concern.

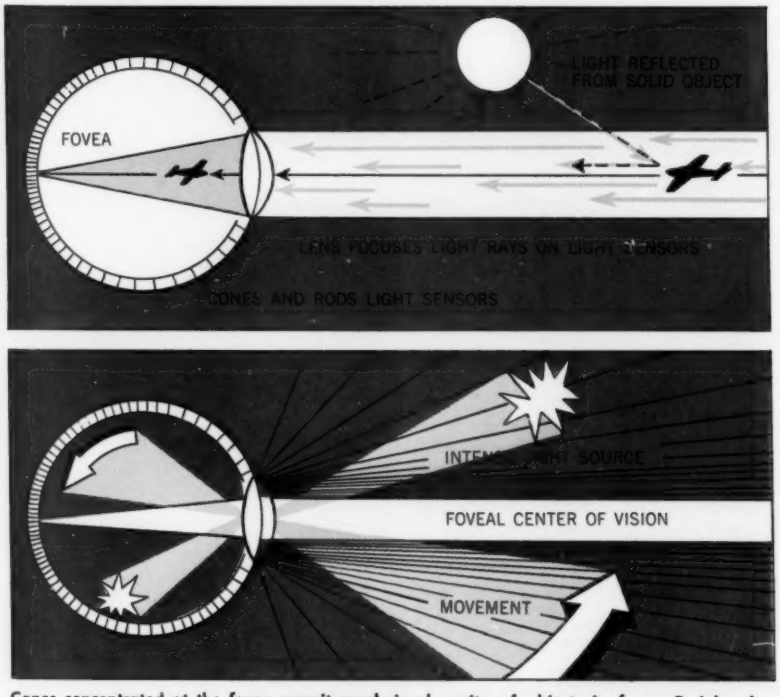
An understanding of "altitude myopia" should lead pilots to be prepared for circumstances in which the apparently good visibility en route does not actually permit aircraft identification at long range. Enhancing visibility by means of strobe lights, special paint, or other anti-collision devices can contribute to air safety. But perhaps the greatest safety lies in knowing the limitations of the human eye under varying weather conditions and realizing that "visibility ten miles" does not necessarily mean a pilot can see or be seen by others at that distance under all conditions.

Haze is an increasingly frequent condition of flight visibility on today's skies, not only over industrial areas but in almost all sections of the country, including the recreational wonderlands of the far west. The vacationing pilot also needs to remember that vision can be weakened temporarily by swimming, diving and other outdoor sports, and the combination of tired eyes and hazy skies can be dangerous. Know your limits.

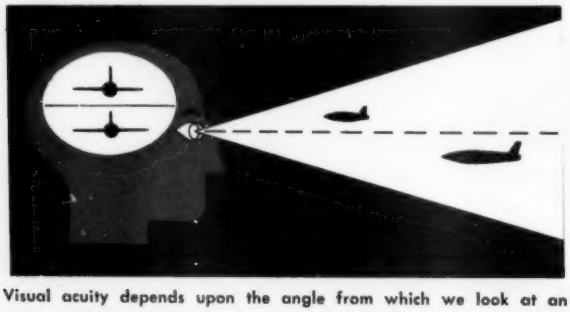
FAA Aviation News



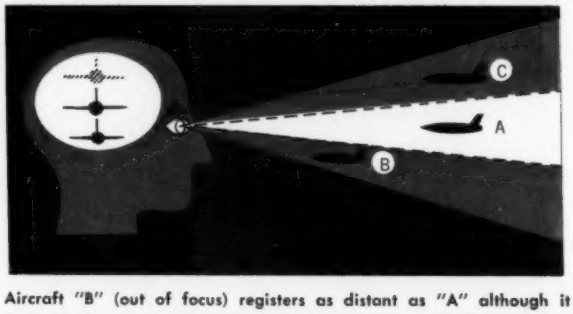
Greater effort is required to visually clear the flight path on a hazy day. When one focuses on a distant point, the focal point tends to recede back toward the eye with the passage of time as the eyes tire and relax, causing one to be "nearsighted."



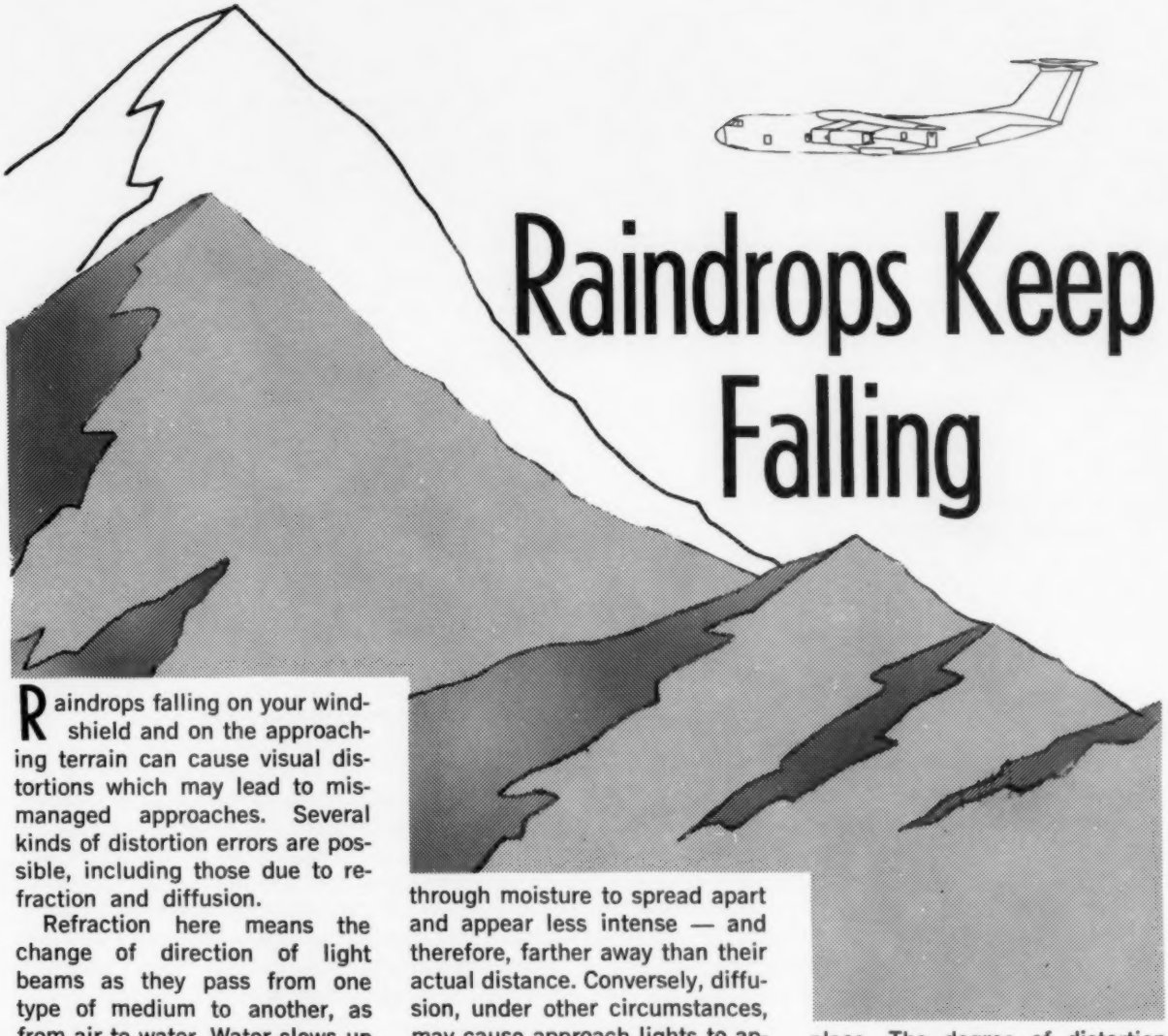
Cones concentrated at the fovea permit good visual acuity of objects in focus. Peripheral vision depends on intense light or movement to stimulate cells elsewhere in the retina. Focal depth as well as distinctness of outline are affected as the object moves into the peripheral range of the eye.



Visual acuity depends upon the angle from which we look at an object. Altitude myopia makes smaller but closer objects appear about the same size as larger ones farther away.



Aircraft "B" (out of focus) registers as distant as "A" although it is much closer. Aircraft "C" (in periphery) seems smaller and less distinct even though it is as close as "A."



Raindrops Keep Falling

Raindrops falling on your windshield and on the approaching terrain can cause visual distortions which may lead to mismanaged approaches. Several kinds of distortion errors are possible, including those due to refraction and diffusion.

Refraction here means the change of direction of light beams as they pass from one type of medium to another, as from air to water. Water slows up the passage of light and causes it to "bend," as in the familiar example of placing a stick in water. Also familiar is the experience of visualizing objects at the bottom of a pool as being at a shallower depth than their true depth, because of the refraction of light by the water.

In heavy rain, even though visibility may appear fairly good to the pilot, terrain contours or lights may seem lower than their actual elevation relative to the airplane. Diffusion (or "halo-ing") refers to the tendency of lights seen through moisture to spread apart and appear less intense — and therefore, farther away than their actual distance. Conversely, diffusion, under other circumstances, may cause approach lights to appear larger, and hence nearer, than they are.

The National Transportation Safety Board has cited such visual distortions during instrument approaches made at night during rainfall as factors contributing to air crashes — including a 707 crash in Samoa which took the lives of 97 persons. The critical point is the moment when the pilot-in-command, transitioning from instruments to visual reference, mistakenly concludes that he is higher than normal and permits a too-rapid descent to take place. The degree of distortion which can take place will vary in accordance with weather and terrain conditions, so that it is not possible to arrive at any rule of thumb for compensating for rain distortion. But awareness of the phenomenon should be enough to enable the alert pilot to avoid mishandling the approach.

Incidentally, the more effective your windshield wipers, the less distortion you will experience, so a periodic check of wiper condition and performance is worth your effort.

FAA *Aviation News*

A Few Tips on the 1976 MAC Flying Safety Writing Contest

If you're reading this sentence, there's a strong possibility that at one time or another you have considered writing an article for THE MAC FLYER or some other publication.

So why didn't you? Possibly because you're not sure how a magazine article should be written, and you don't want to waste your time on a lost cause. That's probably the largest single reason that potential writers never get around to putting their thoughts down on paper. So, to assist you in getting started, we're offering a few tips on how to write an article for THE MAC FLYER. There's no guarantee that our tips will make you a winner. But they'll help.

Planning It

First, determine what ideas you want to convey, and in what order, and make an outline. Spend a lot of time on the outline — an hour or two is a wise investment. But don't try to cover too much territory. Then stick to your outline as best you can.

Writing It

Use simple, easy-to-understand language. Avoid flowery phrases and "25 cent" words. Use strong verbs and *few* adjectives. Remember, the fewer words in a sentence, the stronger the action.

Concentrate on specifics and avoid generalization. For example, a general description such as: "The pilot was talking to his crew as he prepared for the dangerous approach into the strange field surrounded by mountains" isn't as effective as "Sweat trickled down Taylor's forehead as he briefed his nervous crew. They realized that the mountains made a missed approach impossible."

Building a Story

Build your story around either a specific incident or character. If you can combine a strong incident with a strong character, you have the makings of an excellent story. You can help make your characters realistic by letting them speak in conversational English. Some description of both characters and locale may be necessary, but avoid excessive description. It bogs down a story.

An effective opening paragraph, or lead, will either turn a reader away or lure him further into the story. Last year's contest winner started out with a very effective lead: "Charlie MacMillan's dead. That's a fact, final and irrevocable. Such parts of him as were recovered were minutely examined by a skilled pathologist who declared that these meager scraps of flesh were indeed the last mortal remains of Charlie MacMillan, Captain, USAF."

We hope these tips will help you with your entry. But they will be to no avail unless you take time to write. Do your thing and send us two copies of your story, double spaced. Attach a cover sheet with the title, your name, address, and a brief biographical sketch, and send to: The MAC Flying Safety Writing Contest, MAC/IGFE, Scott AFB, IL 62225, no later than 31 March 1976.

Checklists, bold face items, and damsels in distress? That's right, says the author; it all began in those days of yore.

The Proficiency Knights

by Maj Dennis W. Stiles
AF/XODC
Washington, D. C.

All through the midsummer of the year 1238 in southern France there was a drought. There was no rain. No showers were forecast. There were no great, muscular clouds spitting lightning across the horizon — only thin cirrus, like Oriental beards in a high wind, getting wispier and wispier. In June the cool nights drew dew to the dust and the cobwebs. The mornings glistened. By the end of July the mornings were as dull as noons. The cobwebs were brittle. The air lay like a dead hand on the roads, castles, horses and hayfields.

These same poor hayfields, seemingly middle-aged from birth, showed little promise. They wilted fast and died young. There was, in short, what came in later times to be called a fuel crisis, known then as stunted hay.

The horses grew thin. Dogs ran around with their tongues hanging out. Goats gave less milk. The water holes were soupy. The maidens took to their beds and locked their doors. The knights were nervous in July and grumpy by August.

Now there was at this time a great castle on the Rhone River known as Cinqaway. It was known as Cinqaway because it had five sides, because *cinq* means five in French, because *away* means gone in English, *and* because a Sir Spittleswallow, who married the king's grandmother when she was past courting age, had named it Cinqaway in 1211. The castle, in short, had an interesting history. As a five-sided castle on a river, it was also the home of the military staff.

The staff consisted of a large group of knights who were responsible for protecting the peo-

Proficiency Knights

ple from any of their enemies, whether natural or those inspired by man. They tested the collapsible spear, developed the concept of the irreversible advance within boundaries, and advocated big horses. They planned the changes and sometimes changed the plans, and to their credit it must be added that nothing ever slipped through the crack without a full set of wax seals to protect it from the weather.

Within the staff there was a small, elite group of knights known simply as Proficiency Knights. These were knights who both staffed and stayed up to speed, kept their lances as sharp as their quills, took part in both spelling bees and jousting tournaments, pondered and tilted on the same day, spoke two languages with one tongue, kept an eye on the best of both worlds, and invented peripheral vision. In short, they rode a horse twice a month *and* kept up a normal workload on the staff.

This special group of knights received their just desserts: extra turnips on the platter, an extra measure of foam on the beer, extra perfume on the handkerchief under their pillow, an extra wink from the gallery of chaste maidens, an extra ringseal with their personal "X" inscribed, and an extra bath once a year. There was one knight in Cinqaway Castle, however, to whom these extras meant little. That was Sir Boldface, who had personally lost the Battle of Bent Bones by banging his commander in the back with his battle-axe by mistake. But Sir Boldface had overcome this black mark in his career, and rose through two layers of intense indifference to become the first WRSK (Willful and Rightful Safety Knight) in the history of southern France.

Sir Boldface gained a reputation for invasion of privacy. Up and down the kingdom he rode, peering into black eyes, blunting rusty nails, ordering knights not to ride in the rain, dismissing alcoholic overlords, filing down the teeth of tame dragons, tacking safety reminders to trees, testing breastplates for thickness, tying down visors, and sitting on stumps with his head in his hands. He recognized the Proficiency Knight as a particular challenge.

His great breakthrough was something he called The Checklist, which he hung from every proficiency saddlehorn in the kingdom. The Checklist was a simple enough notion. It simply reminded the knight of what he was supposed to do. He could read rather than remember. There was a handy index. In the index, for example, there was a line that said, "Right Turns, eleven twists." By twisting eleven times on his scroll, the knight could find a paragraph on right turns. "Right Turns," it said. "To turn right (e.g., at stumps in the road, in case of attack from the left, or at an intersection), pull on the right rein. If horse refuses, kick with left foot." With these helpful reminders, the Proficiency Knights could concentrate.

Sir Boldface immortalized himself with a kind of checklist dessert — a highlight of the whole thing — which he called the "Boldface Item." The Boldface Item was very important. It was used only in emergency situations, and allowed a quick response with no mistakes. For example, among the numerous situations faced by the normal Proficiency Knight riding the standard small brown mare, there were five critical problems: Runaway Horse, Bucking Horse, Kicking Horse, Horse Giving Birth and Biting Horse. The Boldface Item reminded the Proficiency Knight how to leap into action in each of these cases.

There were obvious advantages. Sir Boldface received an award in which his services were called outstanding, having reflected great credit. In 1237 he went a step further, and made the Proficiency Knights memorize the Boldface Items. He received another award. Again, his services reflected great credit. The accident rate went down. The price of armor went down. The wages of armor mongers went down. The

price of scrolls went up. Sir Boldface became known as one of the local wisemen.

In the drought of 1238 he faced his greatest crisis. This went into history books as "The Hay Crisis of 1238." There was a great deal of heat, little rain, and not much hay. Everyone got grouchy. The horses got thin. Hay got expensive. No one could ride as much as they did. There was a trend of loose saddle girths. The Proficiency Knights, who rode less than the other knights, worried about themselves, secretly. The Head Knights worried about the Proficiency Knights, publicly. The Willful and Rightful Safety Knight worried about safety, overall.

"There must be ways," thought Sir Boldface, "to overcome this crisis." He sat on a stump with his head in his hands for three hours. Then he stood up. "I will introduce two programs," he announced to a nearby crow. "We will have Instructor Knights who will ride with the Proficiency Knights. Also, I will ask the Carpenters of the Court to build me a wooden horse. It will prevent accidents. On it, the Proficiency Knights will keep up to speed."

So it came to pass in southern France in the autumn of 1238 that bold and young Knights Without Any Whiskers rode between the Proficiency Knights and any Persons of Varying Importance who happened to be riding with them. They made sure that the Proficiency Knights were reading the right page in their Checklists. Furthermore, in the small town of Demi, 12 horses were built and mounted onto a circular platform which revolved to the sound of music. They were painted brown, and resembled in every way the small brown mares ridden by the Proficiency Knights. Each horse had the motto, "Practice Makes Perfect," inscribed on its left hip. To make a long story short, the Proficiency Knights could soon ride them blindfolded.

The reforms of Sir Boldface were tested in the great Tournament of Roses (Proficiency) in the fall of 1238. It was the event of the year, with parades. Sir Boldface mulled over his Checklists and compared statistics. His reputation was at stake. He had promised the king a tournament with as much excitement as ever, but no rippled ribs, crinkled armor, dangling eyeballs, dislocated digits or perforated ulcers.

The main event of the day was to be between Sir Gallupup, a planner with a reputation for twists, and Sir Bangsalot, who worked in the basement. They were chosen in random alphabetical order. The two knights were rivals for the hand of the Lady Slyswoon, which added human interest to the jousts. Sir Boldface briefed them both, and personally tied an autographed Checklist to each of their saddlehorns. Meanwhile, flags flapped in the still air.

The Terms of Effronts (TOE's) were for cork-tipped lances, sword flats, rubbed-handled battle axes and quarter-inch knives. Sir Gallupup led out with a cork-lined thrust that dimpled Sir Bangsalot's chin. Sir Bangsalot replied with a sword-flat to Sir Gallupup's cod-piece. Both referred to their Checklists, and were soon reduced to their quarter-inch knives. The battle went on and on.

In the end, it rained. Everyone cheered, especially the king. The main event was declared a draw. Lady Slyswoon blew a kiss to Sir Gallupup, but winked at Sir Bangsalot, all the while writing a feverish note to Sir Boldface. You can imagine how little damage was done. The armor was shiny. The ground was barely trampled. The horses pranced. The king patted the knee of a eunuch by mistake. The wages of healers and sorcerers reached their lowest point in years. The hay grew tall and was excellent for rolling.

Sir Boldface's reforms remained in effect over the years in spite of studied confusion, and for many years the south of France was famous for safety. The name of Sir Bangsalot fell into armored oblivion. The name Boldface prevailed through the years as a byword in safety, and remains so to this day.

Hark to the Ruin

This is the saga of Jeremy Prune,
An RAF chappie whose exploits may soon
Parallel the fame of flyers like Dumbo,
Or some Russian spaceman drifting in limbo.
For Jerry, with background "so terribly British,"
And uppercrust habits which almost were fetish,
Was sent to the New World to an exchange post,
With a Flight Training Squadron to act as his host.

Now Jeremy's forte was piloting choppers,
And instructing young men in avoiding croppers.
And let it be noted at this early stage,
That his skill and experience were vast for his age.
Matters then would be quite painless and easy,
His NATO brethren seemed both bright and breezy.
With a quick local checkout, maybe one ride,
He'd quickly become MAC's foreign pride.

He hadn't allowed for the six months of training,
Or the strange local tongue that kept his brain straining.
Who else calls the undercarriage simply the "gear,"
Eats syrup for breakfast and freezes good beer?
A pattern, thought Jerry, was for making clothes,
And ramps are steep slopes, as everyone knows.
They even had weird names for each new control:
Why call it the cyclic, wot's really the pole?

There were other things that made Jerry ponder
Creating concern and making him wonder,
Did these funny fellows have it all there?
Was the space in their craniums stuffed full of hair?
Their favorite hobby, or so it appeared,
Was battling with maintenance as if they all feared
That instead of working as one operation,
Technicians were planning the Wing's devastation.

He could not quite understand either, why they,
Got awfully excited when one sunny day,
With everything ready and time left to spare,
He got airborne early to stir up the air.
When later informed that this ghastly action,
Caused two heart attacks and one blood reaction,
He did not dare even consider his fate,
If ever he took off just five minutes late.

Honorabl

1975 MAC

Writing

of Jeremy Prune

by Sqd Ldr Ronald R. G. Sivewright, RAF
1551 FTS, Hill AFB, Utah

Now Jeremy Prune was an eight-to-five fellow;
Those six a.m. briefings just turned him to jello.
His mind remained misted, his face coloured lime,
Until he'd been airborne for some length of time.
So one Monday morning he groped through the gloom,
Found students, and orders, and a briefing room.
The battle 'gainst eyelids was quite a stout fight,
While he tried hard to brief them on instrument flight.

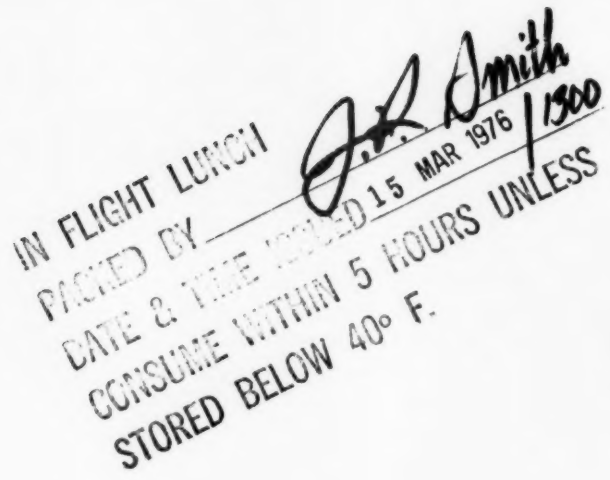
Eventually they got to the aircraft, but wait,
Young Jeremy noted, "We're ten minutes late!"
With scarcely a glance at the seven eighty-one,
He kicked tires and crew chief like a shot from a gun.
He cranked up the donkeys, released rotor brake,
Determined as Nelson that block time to make.
He taxied for takeoff and over the din,
He ordered the rest of the crew to strap in.

Mention
lying Safety
Contest

Then, finally airborne exactly at eight,
He gulped as he said, "At least I'm not late."
Short lived was his relief for then on the air,
To the ramp, he was told, at high speed to repair.
It seemed there was something wrong with the kite,
A nut on a bolt in a plate was not right.
It was down in the undercarriage — sorry, the gear! —
If the landing was heavy the whole thing would shear.

The FM confirmed this, "It's down in the book."
And Jerry regretted not having a look.
But matters more pressing were now on his mind,
As on a large pad the aircraft he lined.
His approach was just perfect, the landing so light,
The crew who'd been sitting with eyes all closed tight,
Relaxed and agreed that, whatever may pass,
Those RAF chappies, they really had class.

Though Jerry was happy, there lingered some doubt,
He realized then what the fuss was about.
He'd got the wrong aircraft, wrong forms, and wrong crew —
In the darkness and haste he'd created this stew.
Some interviews later and some sound advice,
To be frank, some of this was not very nice.
He made a decision he knew would be right:
He'd never again take a six a.m. flight.



Gastronautics-

One of MAC's most durable requirements calls for the pilot and copilot to stagger meal periods during flight to prevent the possibility of simultaneous food poisoning. But mention this to some aircrews around lunch time during a long flight and you may end up with the comedian of the year award. Certainly you'll run the risk of being smothered beneath gales of laughter. After all, when is the last time anyone on an aircraft suffered from food poisoning? Harr, harr. Just isn't done. How old fashioned.

Wrong. Several months ago dozens of passengers, and one crew member, on a commercial jumbo jet were stricken in the largest case of food poisoning in commercial aviation history.

The jet had departed Alaska, en route to Copenhagen. Besides the movies, fun, and excitement of a European trip, the 344 passengers enjoyed a leisurely breakfast. And what a breakfast — cheese omelets, ham . . .

But as the 747 began its descent for landing, several of the world travelers began complaining of diarrhea, stomach cramps, and nausea. Within three hours after landing, 196 passengers plus a cabin crew member became seriously ill. One hundred and forty-three passengers were hospitalized. Not a very happy R & R in Scandinavia.

Public health officials from the U. S. and Denmark investigated the incident. There is no FAA regulation on aircrew eating and investigators decided that only by chance had crew members occupying cockpit positions not eaten the contaminated food.

The investigation led officials to the food handler who had prepared the ham. On his right hand they found two small lesions — infected with staphylococcus aureus bacteria. The same bacteria was found in the sick passengers. The time between preparation of the food and its consumption exceeded 72 hours (including 14 hours at room temperature immediately after preparation and eight hours, unrefrigerated, aboard the aircraft). It was a simple case of an infected chef, plus a suitable incubation period, equalling many galloping gourmets. Scientists said that had the breakfast been served soon after preparation, few, if any, of the passengers would have become ill.

While Lady Luck may have intervened to prevent a disaster, MAC regulations are such that our crews are not dependent on luck. Not only does MACR 55-1 stipulate that the aircraft commander and copilot not consume in-flight meals within an hour and a half of each other during flight, it also suggests they select different entrees from the menu. Both the MAC bible and the warning on in-flight picnic baskets instruct crew members to eat flight lunches within five hours of preparation unless they're stored under refrigeration aboard the aircraft.

The suggestion for pilots to select different entrees is a good one. Even with the best cooks and food handlers in MAC's usually spotless in-flight kitchens, contamination is possible. And choosing different dietary delicacies helps reduce the possibility of the navigator and flight engineer handling that minor chore of letdown and landing.

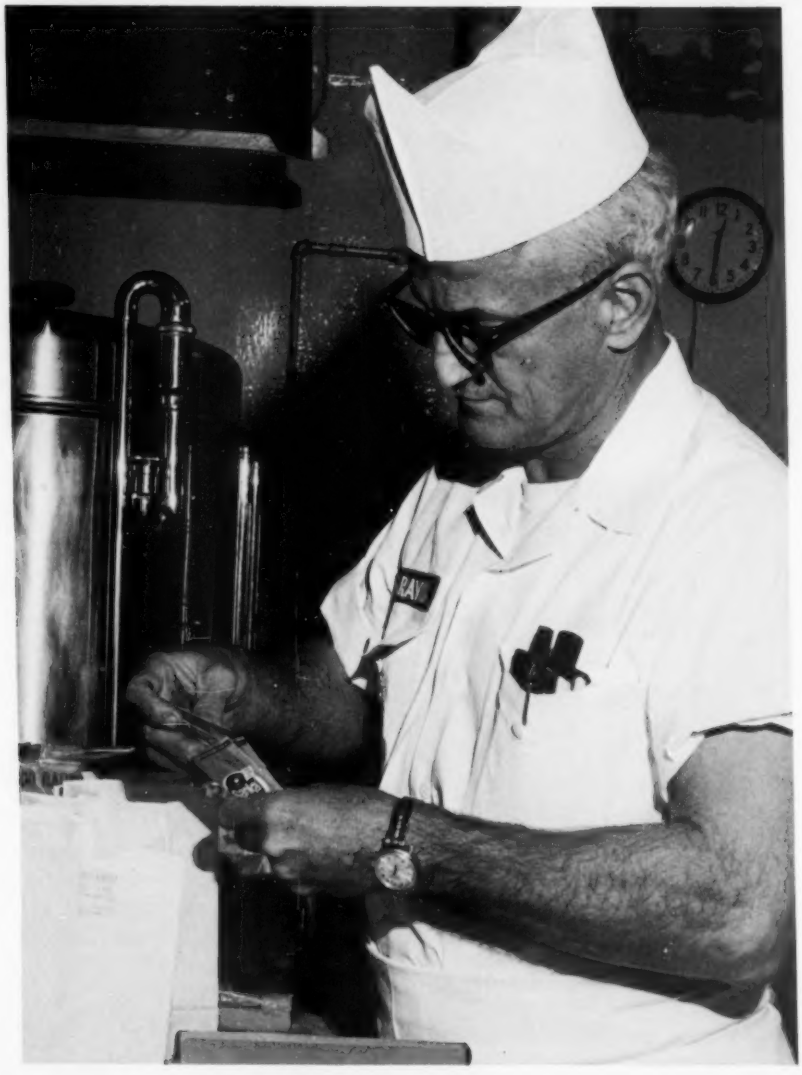
While your navigator and engineer might make subtle innuendoes regarding your pilot skills, they would rather see you shoot a mediocre approach and firm landing than become ill and leave the flying to them.

The lesson here for the "free

You may think it can't happen to you, but it can. The possibility of food poisoning in flight is all too real, and MAC procedures are designed with that thought in mind.

-Chowing Down In Flight

by Maj Orlen L. Brownfield
Associate Editor



spirits" who tend to dismiss the subject of in-flight food poisoning with just a belch or two is that it can happen to you! So the next time your AC (or copilot) starts digging into his flight lunch, hack the clock — even if it evokes a growl from your stomach.

USE CAUTION

Regulations don't detail procedures for eating prior to flight, but there are times when aircrews should use extreme caution.

Not long ago seven of nine C-141 crew members became ill in flight approximately 30 hours after eating a locally prepared meal in a Mideast country. The pilots became incapacitated to the extent that aircraft control was difficult. They nearly landed on a taxiway at their destination but detected their error at the last minute and landed on the runway.

It was almost two weeks before these crew members were well enough to return to their flight duties.

When an outboard engine fails before the gear is up, the guy in the drivers seat may have his hands full overcoming . . .

Yaw,

If you've lost an outboard engine on takeoff lately you'll be among the first to agree it is no laughing matter in a four engine aircraft with wing-mounted engines — which is what most of MAC's heavy transport fleet consists of. Aside from the loss of one-fourth of the aircraft's power — which is problem enough — losing an outboard poses the disturbing possibility that the pilot will end up wrestling with an aircraft bent on self-destruction.

With the reliability of jet engines being what it is today, the chances are slim that you'll be forced to put your engine-out procedures to work during that critical period around liftoff time. That's the good part. The bad part is that because most jet drivers are unaccustomed to their engines giving up the ghost, the element of surprise could turn an otherwise no sweat problem into a dangerous emergency. And due to wing geometry and associated aerodynamic characteristics, pilots of swept wing aircraft may be presented with even greater control problems than those who fly aircraft with straight wings.

Discussing the possibility of an outboard engine failure at or just after takeoff may seem pessimistic. But this particular brand of pessimism has salvaged many an aircrew who refer to it as caution. On the outside chance that you may one day find yourself in such a predicament, you'll want to be ready.

Your best laid plans and those of the mission

Roll, and Drag

by Maj Albert R. Barbin, Jr.
Associate Editor

planners can go to pieces in a hurry when number one or four loses its innards at low airspeed under the strain of high power. Sudden yaw angles of up to 15 degrees will provide a very positive clue that something is amiss — if you didn't already know. A few seconds later the bird may try to roll into the dead engine — a tendency that is likely to create a degree of cockpit activity that has yet to be duplicated even in your most advanced simulators.

A pilot who is right on top of the problem will most likely handle it with no ill effects. But the aircraft commander who delays his reaction unduly could find his bird becoming uncontrollable. The remaining power may be insufficient to offset the rapidly increasing drag. Aside from power loss, drag is the villain that must be overcome.

Dragging the Anchor

One of the principles that our flight school instructors pounded on day after day was that an aircraft in flight is always dragging an anchor in the form of aerodynamic drag or resistance to forward flight. This is no problem as long as the drag is balanced by an equal amount of forward thrust from the engines. But when an aircraft weathervanes into a steady sideslip caused by a lost outboard, the anchor really takes hold. As the aircraft yaws into the dead engine, airflow disturbances about the trailing wing, fuselage, and wing tips generate significant drag — and less lift — than was present before the sideslip. Let's take a look at that anchor. It's actually made of two components — zero lift drag and induced drag.

Zero lift drag is caused by air friction generated within layered films of airflow (boundary layer) around the wing surface (Figure 1). At high angles of attack, the boundary layer thickens. In order for the air to flow across the wing in a given time, the outer layers speed up and separate from the wing earlier than they would during flight at lower angles of attack. The result: increased air friction and

Figure 1. Zero Lift Drag

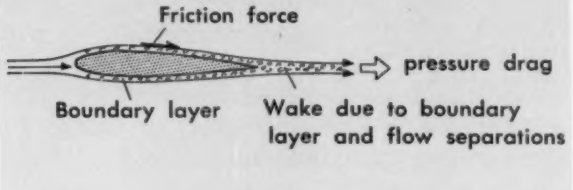


Figure 2. Induced Drag

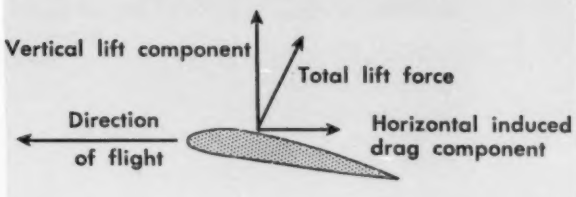
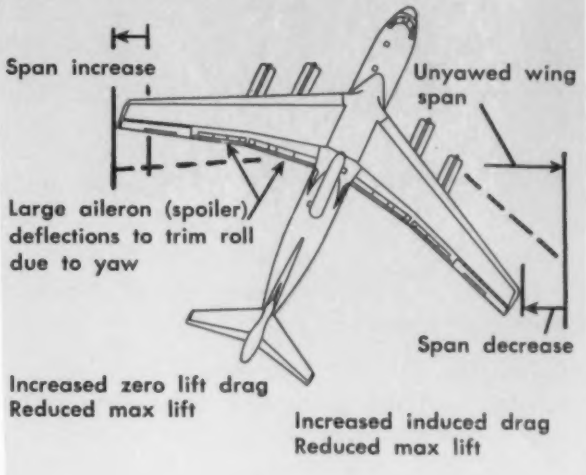
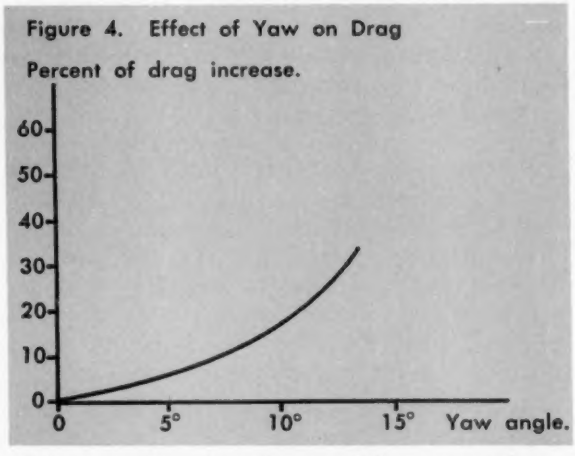
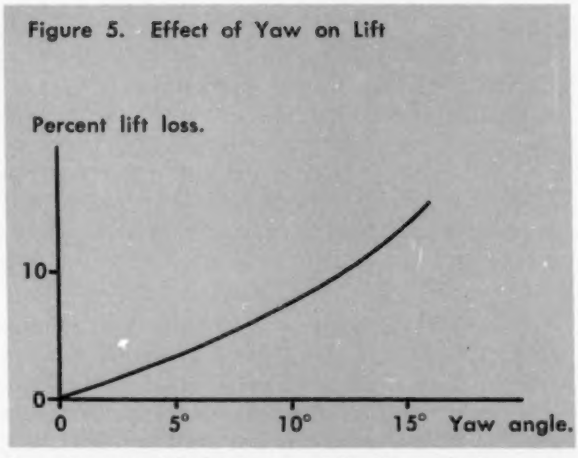


Figure 3. Yawed Flight



Yaw, Roll, and Drag





higher pressure drag due to airflow separation.

Flight at high angles of attack such as during takeoff or final approach with everything "hanging," induces a slight rearward tilt of the overall airlift vector (Figure 2). The horizontal component of the lift vector points aft and is referred to as the horizontal induced drag component. Further increases in the angle of attack will induce greater drag to the point that full engine power may be required merely to maintain flight — the old behind-the-power-curve trick. Ever observe an F-4 or a nearly loaded C-5 on final? You probably saw the aircraft smokin' on in at high power to offset significant induced drag vectors brought about by high angle of attack.

Assume, at liftoff, that number four gobbled up a flight of seagulls and quit. Let's take a look at what would happen to the aircraft if the pilot did nothing. Within three or four seconds, the aircraft would probably stabilize in a ten to 15 degree yaw into the dead engine. The relative span of the trailing wing would decrease while the relative span of the leading wing increased (Figure 3). Remember, this is a swept wing aircraft. Such a relative span differential would induce significant rolling moments toward the dead engine. The "increased" wing sweep of the trailing wing will induce spanwise airflow, from the wing root toward the wing tip, causing more drag and reduced lift. Prolonged flight at higher angles of attack during a yawed condition may produce so much drag that a pilot may find himself short on airspeed.

Opposite aileron alone may simply compound a pilot's woes by reducing flap efficiency, if they are extended, and lift on the leading wing. The overall effect of this would be to decrease lift and increase aircraft stall speed. Continued yawed flight would also induce airflow disturbances around the fuselage and the empennage, adding further drag increases.

Wind Tunnel Tests

Wind tunnel yaw, roll, and drag tests were con-

ducted on a scale model with a 33.8-degree wing sweep. The model was equipped with full span slats, partial span flaps, and ailerons and spoilers for roll control. The model was configured for takeoff. Drag, lift, side forces and moments were measured on the model for yaw angles of four, eight, and twelve degrees. At simulated speeds in the neighborhood of liftoff and climbout (1.2 Vs — 1.4 Vs) drag increases in excess of 30 percent were recorded for a maximum yaw angle of 12 degrees (Figure 4). With the trailing wing close to a stall, opposite roll control was lost at yaw angles of only five to six degrees. Even with ailerons deflected ten degrees, loss of lift exceeded ten percent (Figure 5).

Far more critical to aircraft controllability is yaw onset at the moment of aircraft rotation. Immediate drag increases and lift degradation may reach a magnitude that seriously impedes further aircraft acceleration. Consequently, the aircraft is likely to end up in a climb attitude with insufficient power to offset the added yaw-induced drag and lift reduction. In spite of the gloom and doom of yaw, drag, and the like, the pilot has the means of effectively controlling the aircraft during critical engine-out operations. *Immediate* rudder and aileron will do the trick.

Use the Rudder

Unlike crop dusters and stunt flyers, pilots of large, sophisticated machinery tend to forget why the rudder is attached to their machine. Yaw augmentation and yaw dampening systems, rudder aileron sequence and interconnect devices, and CADC-modulated rudder limit inputs have afflicted some rudder pedals with atrophy. The primary function of a rudder is to provide aircraft directional control through production or reduction of sideslip. Whether the pilot is controlling an engine-out situation or executing coordinated turns, he (or in some cases, a black box in normal flight) is manipulating coordinated rudder displacement.

At speeds at or slightly above air minimum control speed (Vmca), immediate full rudder deflection and a five-degree bank into the "live" engines are essential to offset sideslip and other aerodynamic imbalances. In determining Vmca, the Federal Aviation Agency permits bank angles of up to five degrees into the live engines and requires that Vmca be less than 1.2 Vs. MAC C-141 and C-5 outboard engine-out Vmca's are generally below rotation speed.

It's impossible to apply generalized data from wind tunnel tests and specify definitive yaw controllability characteristics for every multi-engine swept wing aircraft. However, outboard engine loss during or after liftoff will initiate yaw and roll into the dead engine and will spawn significant drag increases. The degree of control degradation depends on a number of interrelated variables such as aircraft design, aerodynamic characteristics peculiar to a particular aircraft, gross weight, power available versus power required, drag and lift coefficients . . . and pilot response. The pilot is equipped to effectively control, limit, and reduce an aircraft's natural tendency to yaw and roll itself into the ground.

References

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"Effect of Trimmed Yaw on Drag and Stall for Swept Wing Aircraft," by Aage Rode, *Flight Safety Facts and Analysis*, Mar 74.

The Rotund One has his own procedure for bellying up to a tanker on a not-so-routine refueling mission.

Blinky! Sammy! Better start packin'. We're about to write a new chapter in the annals of strategic airlift history," heralded the Master Manipulator exuberantly.

"Easy, Boss, or you're gonna have a stroke," implored Long Suffering Sam.

"Yeah, Boss, where we going and what are we gonna do that's so special?" asked Blinky.

"M'lads," explained C. R., "in exactly 48 hours, one each C-5 under the command of your Able Aeronaut will depart Doverton with 120,000 pounds of priority one Navy cargo destined for Perth, Australia, heh, heh, heh . ."

"Great," smiled Blinky, "but how are we gonna make airlift history doing that?"

". . . nonstop," continued C. R. with a proud grin.

"Nonstop! Wow!" exploded Sammy.

"You gotta be kidding," moaned Blinky.

"Do I detect a note of consternation in the voice of my one and only Magellan?" teased the Aviator with Avoirdupois.

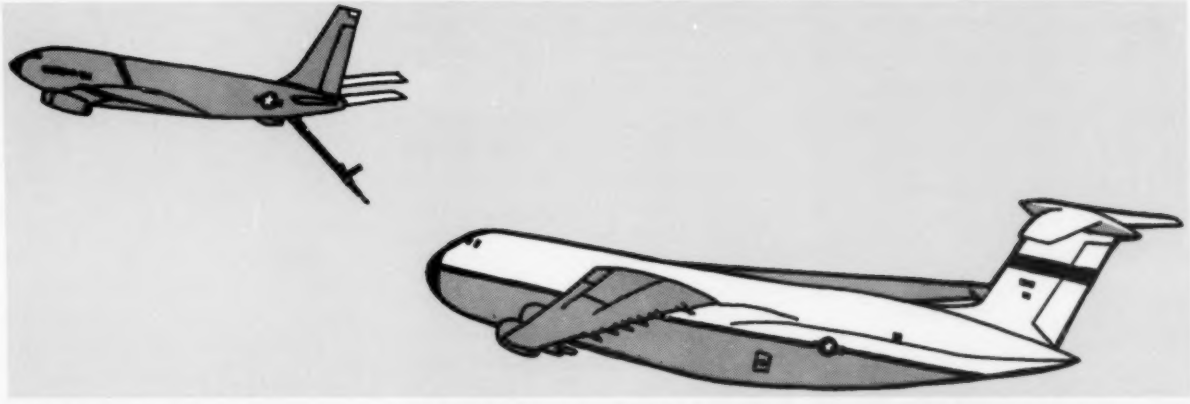
"Yessir, it's the 'one and only' part that concerns me," replied Blinky.

"Tut, tut, my faithful plotter of LOP's. You're gonna have some help. In fact, we're all gonna have some help. Why, at this very moment Major Scuttle and his Altus crew with two navigators are winging their way here. Seems they want to peruse MAC's virtuoso of air refueling," boasted C. R.

"Sir, we'll have to hook up with a tanker at least three times," prompted Blinky.

"Right you are," grinned C. R., "three in-flight refuelings is our ticket to frolic and fun on the beaches of Perth. We'll make our initial rendezvous with our flying gas station south of Elmendorf.

"Hey, Boss, is our crew goin' to be makin' all three refuel-



ings?" questioned Sam.

"Not exactly, m'boy. I've graciously consented to let Major Scuttle's crew play tag with the tanker on the second refueling," said C. R. humbly.

"Excuse me, Boss. I think we'd better stop by route briefings and pick up an armload of charts and a copy of the tentative flight plan so we can sit down and plan this thing out," invited Blinky.

"No need to fret, m'Magellan. We know how you like to cut 'n paste and play crayola. Go on and do your thing," soothed the Silver Tongued Fox.

* * *

"Aren't you travelling kind of light, Sir?" interrupted Sammy. C. R. hoisted his hand-tooled, baby-blue doeskin hang-up bag up the crew entrance ladder.

"The sunny climes below the equator require minimal apparel redundancy, Sammy. By the looks of your baggage, you must think we're RON'ing in an igloo," Chastised C. R.

Within an hour Sammy had rattled off the lengthy checklist. Minutes later, the aerospace team of C. R. Terror had joined the tumbling mirth of sunsplit clouds and headed for Northwest Canada.

* * *

"Blinky, m'boy, 'tis nearly time for our rendezvous in the sky. Better sharpen your pencils and massage the radar machinery. The dispenser of low-lead JP is off Eielson.

"Boss, everything's humming along without a glitch. The tanker should receive our SKE squawk anytime now," replied Blinky.

"Remember, Blinky, the eyes of MAC are watching," cautioned the Pompous Pilot. "It'll be up to you and your counterpart in the tanker to exercise your mystical powers for the rendezvous. But once I've got him visual, m'boy, you can pack up your pencils and dividers, swivel your chair, and carefully observe my cool precise manipulations."

C.R. TERROR

"MAC four five five, Texaco three seven, over," crackled the UHF.

"Go ahead, Texaco," acknowledged Long Suffering Sam.

"Got you radar identified, eleven o'clock at fifty miles on a track of 300 degrees," radioed the tanker crew.

"That tallies," responded Blinky checking the radar return rapidly closing from the eleven o'clock position on his scope.

"Okay, Boss, just maintain course and altitude," advised Blinky. "The KC is starting his 180-degree turn to 300 degrees.

"I can plainly see the Boeing feed bag in the sky. To expedite our pit stop, we'll start closing the gap with gusto," said C. R., advancing the throttles of the powerful engines.

"But, Sir, we're going too fast for precontact positioning," warned Blinky.

"Balderdash, all that namby-pamby precontact positioning stuff simply gives novices a pause to overcome their mental blocks. We'll just press on in, top off the tanks, back off, and resume course to the land Down Under, heh, heh."

"Sir, if we don't start slowing up in a hurry, our bow wave may upset the tanker," insisted Sammy. "We're supposed to maintain a slow rate of closure so his autopilot trim can keep up with changing airflow over his horizontal stabilizer," implored Sammy.

"Nonsense, Sammy. Observe. We're less than 40 feet from the boom and they haven't fallen out of the sky yet," laughed C. R.

"Break away, break away," radioed the tanker pilot as his aircraft abruptly pitched down. "Hey, MAC, that's a little too fast. Back off to precontact position and try it again — slowly," suggested the tanker commander.

The Galaxy renewed its refueling profile. Meanwhile, the boom operator, Master Sergeant J. P. Foar, manipulated the boom controls with the delicate precision of a neurosurgeon.

"Aft . . . aft . . . up . . . up . . . lookin' good, lookin' good. Up . . . up . . ."

"Boss, we're drifting left . . . now right. We're dancing from side to side," observed Long Suffering Sam.

"What's the matter with you, Sammy? Our position is as solid as a rock. It's the tanker that's dancing all over the sky," barked C. R., beading with perspiration.

"Okay, back off a might and settle down," soothed the boom operator.

"Back off and settle down," blustered the Master of Wires and Tires. "That tanker crew must be suffering from acute white

knucklitis and chronic short attention span. They get one more chance, Sammy. It's time for quick action and a sure strike."

C. R. readied his thirsty machine for one final assault.

"Whheeeee, here we go. Hey, Texaco, get ready to put a tiger in our tanks and would you check the oil and clean the windshield while you're at it," challenged C. R.

"Boss, we're movin' in too fast!! And we're too high!! The boom's going to hit the radome!" gasped Sammy.

"Break away, break away!!" cried the boom operator.

The Fearless Flyer slammed the throttles back to the stops and dropped the inboards into reverse. But it was too late.

Kerruuuncch!

The boom pierced the radome before Sergeant Foar could fly it up and away from the onrushing Galaxy.

As the gulf between the two aircraft rapidly widened, Sammy leaned forward to view the wound. "Boss, the refueling boom is still stuck in the radome. We plucked it clean off the tanker!"

"Ugghh! Ahem, must have been a combination of high altitude wind shear, clear air turbulence, and temperature inversion," rationalized the Rotund One.

Banking southwestward, the wounded jumbo jet faded into the arctic horizon like a harpooned sperm whale disappearing in the briny deep.

* * *

A veil of light snow hung silently over Elmendorf as the Aviator with Avoirdupois steered the mighty Galaxy toward the ILS localizer.

"You know, Sammy, it could have been much worse. If I hadn't instinctively wrenched our aerospace steed away, we might have gone into the igloo business below. But thanks to my aeronautical adroitness, the maintenance troops will soon have a new radome installed and we'll be heading south again," C. R. reassured his copilot.

"Well, Boss, I hope you're right. But I'll bet there's a group of investigators who'll be wanting some answers," voiced Sammy apprehensively.

"Tut, tut, m'boy. I happen to be a personal friend of General Smoothly, the wing commander here. He'll see to it that we're out of here in no time at all."

"Sir, General Smoothly retired last October and General Lockjaw is running the wing now," revealed Sammy.

"General Lockjaw!!!" cried C. R.

"You know him?" asked Blinky.

"Ah yeh, we've met before," muttered the Master Manipulator.

The crew entrance ladder telescoped to the snow-packed ramp, and General Lockjaw and party bolted upward onto the flight deck.

"Ah, we meet again, Major Terror. What feeble excuses are we panhandling now? Turbulence, wind shear, or might it be some other mystical manifestation? Whatever, plan on a lengthy stay. Major Scuttle, plan on departing as soon as the cargo is loaded onto the backup C-5." With that, the general departed the flight deck.

Dressed only in a summer flight suit and carrying his doeskin hang-up bag of lightweight wash 'n wear, C. R. bobbled down the snow-covered crew entrance ladder.

"Yeeoooww, it's cold. Sammy, m'boy, quick, lend me your spare arctic flight jacket," stuttered C. R.

"Sure, Boss, but I don't think it'll fit you. Anyhow, it has the wrong rank and nametag on it."

"So it does," muttered C. R., "but right now, I'd be willing to change my name to anything at all."

Quick Stoppers

Promises, Promises

The T-39 aircraft commander knew that an arresting cable on the runway could spell problems for his extended speed brake, so he told his copilot that he planned to retract it after touchdown.

The Sabreliner touched down and the copilot reminded the AC of his promise. But for some reason the AC left the speed brake extended. Sure enough, it happened. As the aircraft sped over the barrier, the speed brake dragged across the cable with a sickening scrape. The speed brake was bent and both hinges and the left actuator were torn off.

There are several types of arresting cables at Air Force installations. Some recess into the runway and some don't. And the Navy has some of their own. It's difficult to tell which is which, so the safest ways to deal with runway barrier cables are to land with the speed brake retracted, retract the speed brake prior to rolling over a cable, or plan the touchdown beyond the barrier, runway length permitting. Could keep you from getting into a big scrape.

I Want My Wheel

A crew ran out of emergency checklists and was about to run out of ideas when the left main gear of their C-130 refused to go either full down or full up.

They attempted to crank the left gear down. But it jammed about 12 inches above the down position. Meanwhile, through Conference Skyhook and phone patch, the crew talked with a Lockheed tech rep who, they hoped, would shed some light on the stubborn system.

Armed with the knowledge of one more expert, they lubricated the gear's jack screw, shoes and vertical torque shafts. Again the gear was handcranked, and again it jammed. A revolting development — but the fliers still weren't beaten. They decided the reason the gear wouldn't extend was that the aft landing gear strut outer ring was contacting the shelf bracket. So two crew members, using the anchor arm supports, pried the main landing gear strut outboard while the pilot helped by placing the C-130 in a left turn to create added g-forces on the stubborn gear. The universal joint on the aft torque shaft was disconnected and the gear was cranked down.

The cause of the malfunction was the strut's upper right hand shoe which had broken. The upper shoes were also out of the track. The problem was solved by a knowledgeable crew employing all the assistance they could find, including none other than — — you guessed it — Conference Skyhook.

Went Straight to Hail

The crew had encouncountered numerous nonforecast thunderstorms during a descent into Brasilia, Brazil, and were doing their best to thread through the maze of buildups.

Approach control was not equipped with radar, so no help there. How about clearance to deviate their C-130 around the thunderstorms? Sorry, deviation would cause a conflict with other traffic.

The crew bit the traditional bullet and attempted to steer through the wall of thunderbumpers now dotting their radar scope. But just as they had feared, they ran into trouble. Now level at 6,000 feet and flying at 170 knots, the plane turned sharply right to pass between two buildups. Suddenly the C-130 was rocked by moderate turbulence, heavy precipitation, and piercing hail. After getting through the weather, the aircraft landed. There was hail damage to the radome and a lox servicing access panel was missing. The jaunt through the domain of cumulonimbus had cost the government $1,230.

Did the crew buy the blame? Nope. Investigators noted that at no time had thunderstorms been forecast for Brasilia and that in view of the limited options, the crew chose the best course of action.

A thunderstorm and its cast of meteorological characters can rip an airplane up very quickly — even under more favorable conditions than those encountered by this crew. And operating into a facility that has no radar-equipped approach control requires *particular* attention by aircrews and operations personnel alike.

Galaxies by Starlight

It was night and the C-5 taxied slowly on the parking ramp. On the row to its left was a parked C-5; the plan was to park the two aircraft tail-to-tail.

As the pilot turned his Galaxy right toward its parking spot, the left wingtip passed under the fuselage of the parked C-5. But as the C-5 straightened out of the turn, its left horizontal stabilizer smashed into that of the parked aircraft.

There were some extenuating circumstances involving a C-5 parking plan in this costly incident, but some not so extenuating ones as well. For instance, transient alert personnel marshalled the giant transport close to the parked aircraft without sufficient taxi signalmen or wing walkers, and the pilot continued taxiing without them.

We all know that swept wings "grow" during turns, and this incident is a classic example of how the tail of an aircraft can also "grow."

Qs

Believe It — Or Not

This incident is enough to stagger even the imaginations of veteran quality control inspectors who believe they have seen just about everything.

Mechanics had torn into the fuel cell on a C-130 and were preparing it for maintenance when they saw an object that they couldn't identify. Upon closer inspection, the surprised mechanics found four seat cushions inside the fuel cell. The cushions were 30 inches long, 18 inches wide, and four inches thick. They were constructed of fuel tank foam and were covered with a leatherette material — which had begun to deterioriate.

No one knows for certain how the cushions got there or who was responsible. Investigators surmise that during previous fuel cell work, maintenance personnel decided they might as well get comfortable while they worked and placed the cushions in the cell. For some reason they were never removed.

There's no way that an aircrew can inspect a plane for foreign objects in the fuel tanks, so the first indication they're likely to get is when an object plugs up a fuel line and causes an in-flight emergency. So, to whom it may concern, give that a thought the next time you decide to "sit down on the job."

A Hearty Appetite

It was a nasty night to be out in the weather, but the engine mechanic, wrapped up in his poncho, was methodically performing duties adjacent to a jet engine that was being run up. Suddenly a gust of wind flipped the corner of his poncho into the engine intake. The engine sucked the poncho right off the mechanic and into the intake. Fortunately, the mechanic held onto the engine frame for dear life and escaped the unpleasant consequences of becoming the engine's main course. The poncho proved a little too spicy for the machine and it soon flamed out. But the meal cost the government more than $8,000.

Personnel error caused this one. The mechanic was wearing loose-fitting clothing in violation of FOD directives. 'Nuff said.

Passenger...Service?

Passengers on an H-3 that had just made an emergency landing learned the hard way that termination of the emergency didn't necessarily mean an end to their problems.

The chopper had been airborne for two hours when a crew member noticed oil leaking from the main transmission area of the cabin. In a few minutes the leak had developed into a steady stream, so the aircraft commander landed at a nearby civil airstrip.

The helicopter was evacuated and that's when the passengers learned that, although they had made it through the emergency, they hadn't gotten out unscathed. The oil had soaked their baggage, leaving them with a greasy mess instead of the fresh clothing they had started out with. The scary in-flight emergency was attributed to a maintenance person who failed to follow tech data while installing a reducer in a transmission pressure line.

after deadline . . .

NEW GROUND SAFETY MAGAZINE PUBLISHES -- Beginning this month Aerospace Safety magazine will devote its contents exclusively to flying safety. Ground safety, aircraft maintenance, missile, and other nonaircrew operational material will be deleted and published in a separate aircraft/weapons maintenance magazine titled Maintenance. The first issue of this quarterly publication should reach the field this month.

Requirements for Maintenance should be established through the PDO with the distribution ratio of one magazine to each ten persons engaged in aircraft, missile, munitions, and egress maintenance duties.

SEXTANT PORT REFUELING -- That's right. While on a stopover at a civilian field, a T-39 was refueled through its sextant port by a civilian refueler. The refueling operation had gone well until the attendant prepared to service the fuselage tank. Mistaking the sextant port on top of the fuselage for the refueling receptacle, he inserted the pump nozzle and began pumping. One of the pilots halted the operation after spotting fuel splashing from the top of the aircraft, but not before several gallons of fuel had been pumped inside the plane. By now, we should all be aware that anything can happen. You Sabrelifters would do well to monitor refueling operations the next time you stop over at a nonmilitary installation.

NEXT MONTH -- The pastoral setting of a shepherd and his flock becomes a nightmare when a veteran helicopter pilot creates an "Incident at Wolf Creek Pass."

Do pilots really deserve their image as dashing adventurers with a keen eye for the opposite sex? You may be surprised at the answer when you read "Ego Trip -- Or Hidden Message?"

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Touch 'n Go

"YOU CAN COME OUT NOW, SARGE. THE MSET INSPECTORS HAVE LEFT."